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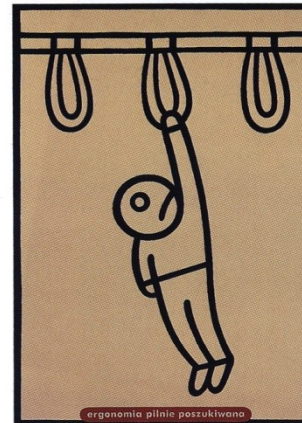
A silhouette of a person stands on a dark, rocky mound in the foreground, looking up at a large crane and a tall structure. The background features a bright sunset or sunrise over a hilly landscape, with power lines visible on the right.

“You do what?
You’d better show me....”

Mic Porter - School of Design
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- Ergonomics
(UK)
- Human Factors
(USA)
- Engineering Psychology
(Pacific Rim)



Petr Šmalec

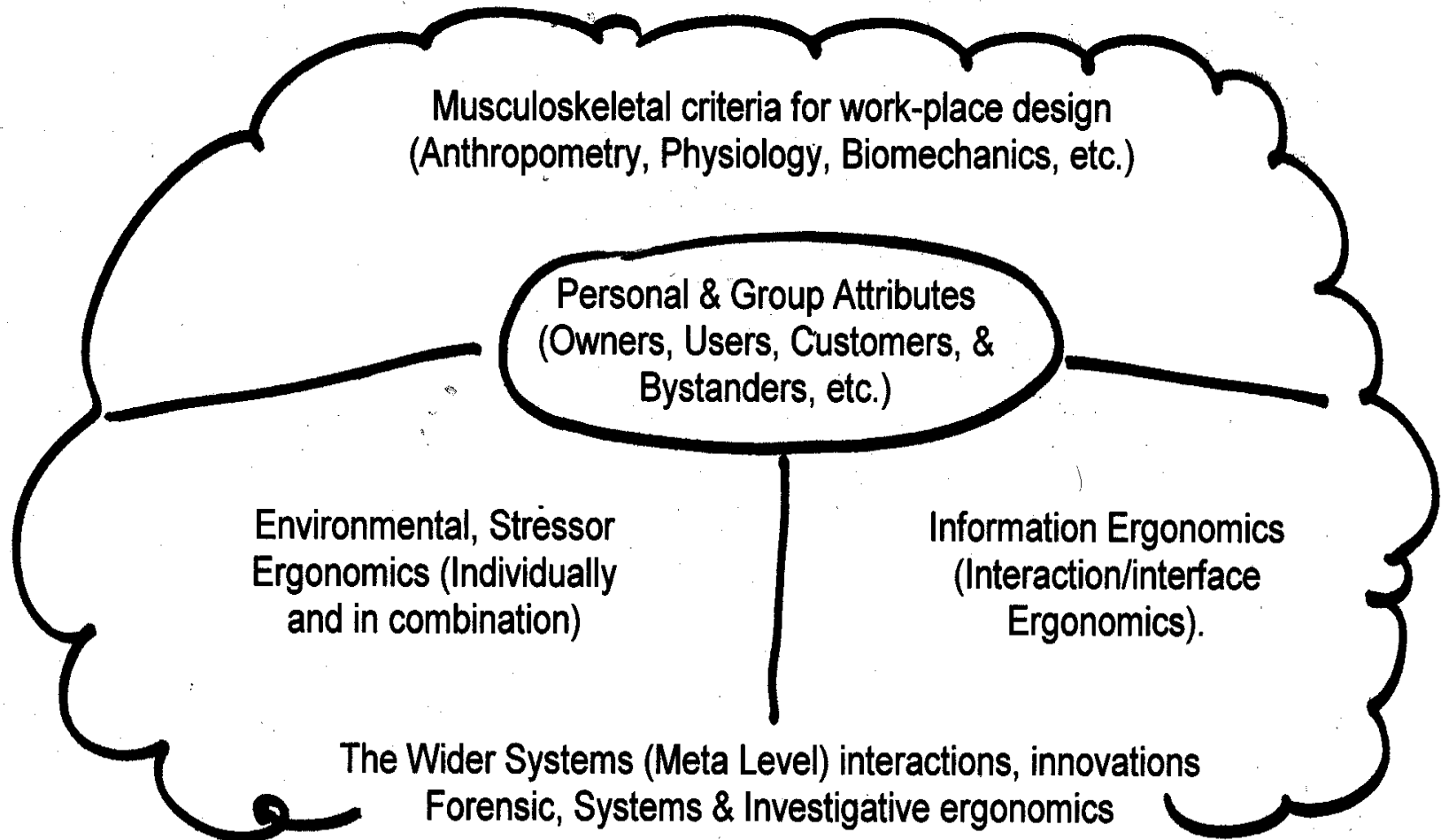
Ergonomia pilnie poszukiwana
Ergonomics urgently required

Ergonomics is concerned with:

- People
- Comfort, health and well-being
- Science
- Technology
- Psychology/sociology/medicine/philosophy....
- Unbounded situations
- Complex interactions
- Emergent properties
- Interacting systems, rigorously evaluated & interpreted

In fact – just like real life!

The Specified Problem Boundary
Systems, Investigative, Applicable Ergonomics and organisational
financial appraisal and culture and the interactions.



Individual/group considerations

- Gender, intelligence, age, physique, body size, training/experience/ motivation, task, work group behaviour, internal stressors (eg sleep debt, *position* on circadian and other rhythms, effects of alcohol, tobacco, pharmaceuticals and *street drugs*, individually and/or in combination)

Person – task/machine communications considerations

- Task type, Information in/out format, quality and quantity, mode, image, display/control design, individual and group stereotypes, display/action/control compatibility, cognitive engagement with software

Person – task/(work)space considerations

- Anthropometrics, biomechanics and physical/personal/defensible space, built and filled environments, spatial layout, machine size and positioning, furniture dimensions, “obstructions”. Pace/frequency/load musculoskeletal interactions – (slow/infrequent/*heavy* or fast/frequent/*light*), ease/awkwardness of object handing etc.

Person – Environment considerations

(especially in combination)

Physical	Light, colour, sound, vibration, heat, ventilation, movement, electro-magnetic radiation, pressure
Chemicals	Dusts, fumes gas, liquids, (micro) biologicals, animals, insects
(Socio)Psychological	Work team behaviour, command structure, pay, welfare, shift conditions, urban/village location, cultural factors

Person-System considerations

- Legal/regulatory, organisational, strategic, corporate, and cultural, *groupthink*, emergent properties, motivational issues (inc pay scheme), weltanschauung related issues, criticality of task/operation, *accidents*, catastrophic failures, secondary health/safety and counter-intuitive behaviour, feedback -v- feedforward control

A few examples:

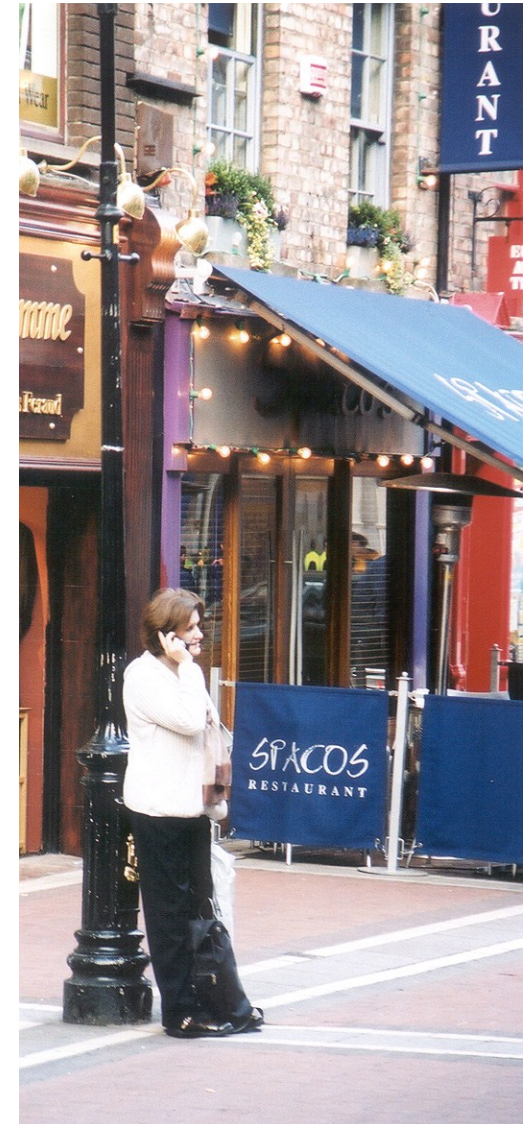
Teaching (“chalk & talk”) - Richard Feynman (Image © CalTech – c1972)



Striking firefighters North Shields 1992



Garda Officer/making a call – Dublin (2003)



Cleaning the hotel windows/painting the house (2000 & 2003)



Barge work - 1996



Stone cutting - 2004



Celebration cake icing - 1996



A factory sewing task – North East (1998)



University Sports Centre – Reception (During a critical rugby match, 2003)



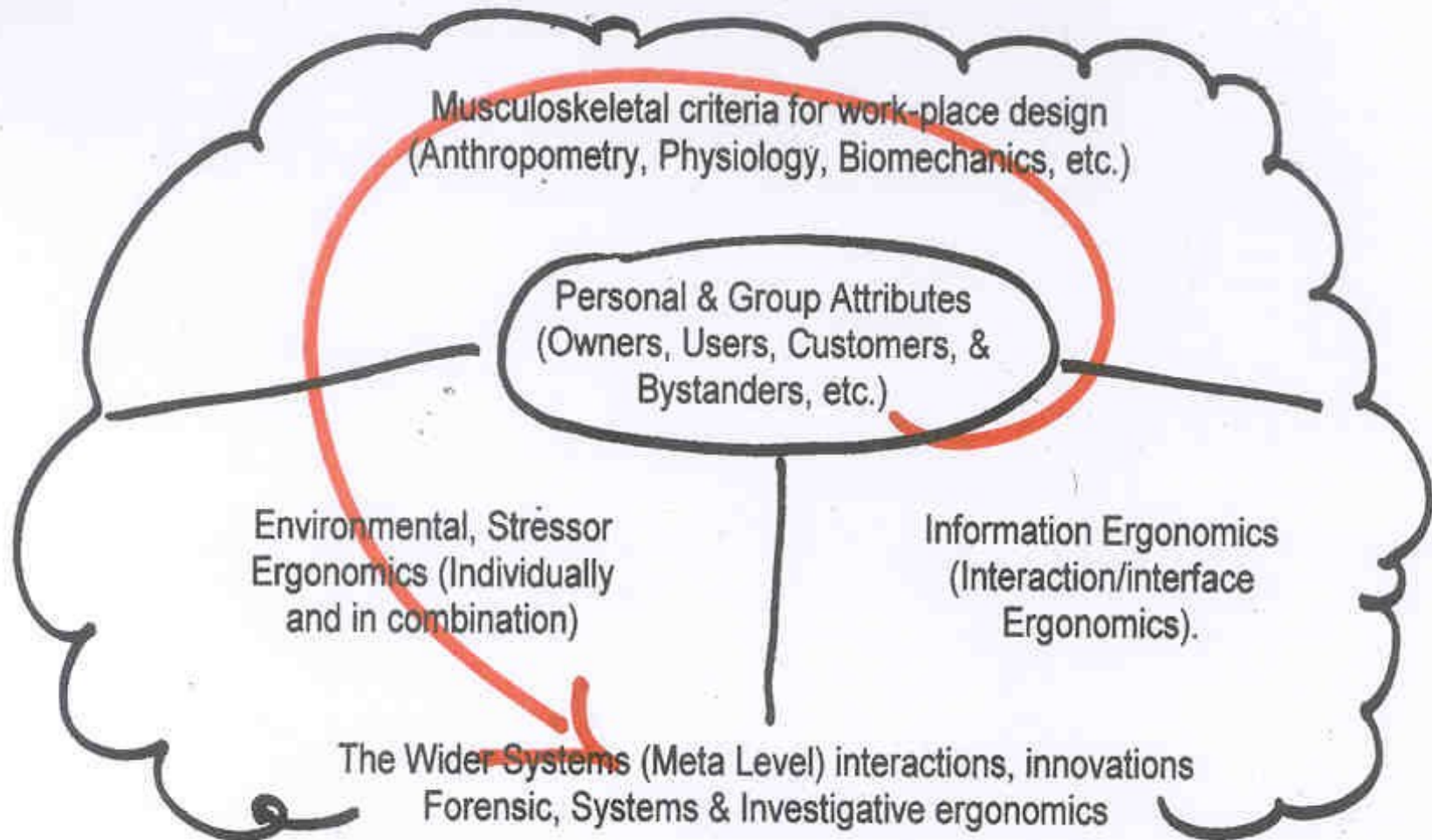
Musculoskeletal evaluation/recording techniques (1)

- Pace – slow/fast
- Frequency – infrequent/frequent
- Weight – Light/heavy
- Other: ease to grip/hold/move
load stability
consequences of dropping
environment/terrain/
journey length

Musculoskeletal evaluation/recording techniques (2)

- Overview
- MAC – Manual Handling Chart (HSE)
- RULA – Rapid Upper Limb Assessment
- REBA – Rapid Entire Body Assessment
- OWAS – Overall Work Assessment System

The Specified Problem Boundary
Systems, Investigative, Applicable Ergonomics and organisational
financial appraisal and culture and the interactions.



Outline checklist

- **Individual/group considerations**
- **Person – task/machine communications considerations**
- **Person – task/(work)space considerations**
- **Person – Environment considerations**
- **Person-System considerations**



Magda Szymeczko, Andrzej Leraczyk

Technika przyjazna człowiekowi
User-friendly technology

Award winners from the Occupational Safety Poster Competition 2000
organised by the Central Institute for Labour Protection - POLAND



Eugeniusz Skowider

Ergonomia
Ergonomics

Award winner from the Occupational Safety Poster Competition 2000
organised by the Central Institute for Labour Protection - POLAND

Thank you – any questions?

